

5244-0051-2X DIV

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Group 270A

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF:

TETSURO MOTOYAMA

SERIAL NO: 08/738,659



GROUP ART UNIT: 2756

FILED: OCTOBER 30, 1996

: EXAMINER: LUU

FOR: METHOD AND SYSTEM FOR
DIAGNOSIS AND CONTROL
OF MACHINES USING CONNECTION
AND CONNECTIONLESS MODES
OF COMMUNICATION

APPEAL BRIEF

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

This is an appeal from the decision of the Examiner mailed November 25, 1998, in rejecting Claims 10, 12-19, 36, 38-44, and 52-61 in the above-identified application. Proposed findings of Fact and Conclusions of Law are included as Appendix B. *See Gechter v. Davidson*, 43 USPQ2d 1030 (Fed. Cir. 1997).

I. REAL PARTY IN INTEREST

The real parties in interest of the above-identified application are the assignees of this application, Ricoh Company, Ltd. and Ricoh Corporation.

II. RELATED APPEALS AND INTERFERENCES

U.S. Patent Application No. 08/738,461 filed October 30, 1996 (Atty. Doc. 5244-052-2X DIV) has the same parent application as the present application and is

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concurrently being appealed with the appeal of this application. Although the claims of this related application have been determined to be independent and distinct from the claims of the present application by virtue of the Examiner's restriction requirement, the claims are none-the-less related to a certain extent and have been rejected using common references. There are no known other appeals or interferences which will directly affect, be directed affected by, or have a bearing on the Board of Appeals decision in the present appeal. It is further pointed out that there is an application 08/916,009 (Atty Docket 5244-0070-2X CONT) which has the same parent application as this application and claims subject matter which is related to the subject matter of this application, but this related application is not on appeal.

III. STATUS OF CLAIMS

The rejection of every pending claim including Claims 10, 12-19, 36, 38-44, and 52-61 is being appealed. There are no claims in this application which have been allowed or indicated as containing allowable subject matter, and each of the claims which was pending at one time in this application which is not being appealed has been cancelled during the course of prosecuting this application.

IV. STATUS OF AMENDMENTS

The last amendment filed in this application was on September 21, 1998. As this amendment was filed when the application was not under a Final Office Action, this amendment has been entered into the application. There are no un-entered amendments in this application.

V. SUMMARY OF THE INVENTION

The present invention is directed towards a method and system for communicating, using Internet electronic mail, between a monitored device and a monitoring device. The monitored device is generically recited in the independent claims but the specific implementation recited in the specification, which is not to be used to improperly limit the claims including the independent claims is a business office device as recited in Claims 12 and 38. Specific implementations of the business office device include a copier, a digital copier, a facsimile machine, a scanner, a printer, a facsimile server, or other business office machine. See e.g., page 14, lines 16-20 of the specification, and element 24, 28, and 32 of Figure 1, for example.

The independent claims recite the utilization of status information determined using sensors. The specification discloses the use of many different types of sensors found in business office devices (or other devices) and such sensors are described in the specification throughout pages 12-15. It is to be noted that the sensors of the present invention are not limited to the sensors used in a business office machine but may be any type of sensors including the sensors found in "a metering system including a gas, water, or electricity metering system, vending machines, or any other device which performs mechanical operations, has a need to be monitored, and performs a function." See page 14, lines 20-26.

Figure 11 illustrates one of the processes of the invention in which the monitored device transmits information such as density information to the monitoring device. The description of Figure 10 is set forth in the specification at page 20, line 23 - page 22, line 2. Claim 10 specifically recites that the monitoring device requests a status of the monitored device using sensors. This request for status is transmitted using Internet electronic mail.

Page 21, line 14 - page 22, line 2 describes how the monitoring device transmits a connectionless-mode of communication and the specification at page 18, lines 8-22 describes how a connectionless-mode of communication may be implemented using Internet e-mail.

Claims 18 and 44 of Group IV describe the use of a connection-mode of communication when the status information is outside of the normal operating parameters. This feature of the invention is supported by the specification at lines 13-26 of page 19.

VI. ISSUES

The only issue in this appeal is whether each of the pending claims including Claims 10, 12-19, 36, 38-44, and 52-61 are unpatentable under 35 U.S.C. §103 over Kraslavsky et al in view of Cohn et al.¹

VII. GROUPING OF CLAIMS

The pending claims fall within four separate groups as follows:

Group	Claims
Group I	Claims 10, 14-17, 36, 40-43, and 52-61
Group II	Claims 12 and 38
Group III	Claims 13, 19, and 39
Group IV	Claims 18 and 44

¹While the top of page 8 of the Office Action mailed November 25, 1998 implies that the rejection of Kraslavsky et al in view of Johnson et al is maintained, a telephone conference which occurred between Examiner Luu and Applicant's Attorney, James Kulbaski, on January 26, 1999, revealed that Kraslavsky et al in view of Johnson et al is not being used to reject the current form of Claims 16-18 and 42-44.

VIII. ARGUMENT

A. Argument With Respect to Group I

1. Summary of Argument

Each of the independent claims of this application has been rejected under 35 U.S.C. §103 using the combination of Kraslavsky et al (U.S. Patent No. 5,537,626) in view of Cohn et al (U.S. Patent No. 5,740,231). The primary basis for the appeal of the Examiner's rejection is that, contrary to the Examiner's hindsight assertion, one of ordinary skill in the art would not have any motivation to modify the primary reference of Kraslavsky et al to operate using Internet electronic mail as disclosed in the secondary reference to Cohn et al. As there is no appropriate motivation to combine the references in the manner set forth in the outstanding Office Action, the Examiner's decision must be reversed.

2. The Outstanding Rejection

Kraslavsky et al disclose a printer system in which the printer can transmit status data over a Local Area Network ("LAN"). Reading the Background of the Invention section of Kraslavsky et al, it is evident that the purpose of Kraslavsky et al is to enable a printer to transmit sufficient amounts of data to a LAN to enable the printer to be an effective and intelligent member of the network. See column 1, lines 59-63. Based on the problems with the prior art disclosed in Kraslavsky et al, it is clear that Kraslavsky et al's essential purpose is to overcome the problem of a limited transmission of status and control information which can be utilized and exchanged in conventional systems. See column 5, lines 24-28, column 6, lines 18-26, and column 4, lines 3-14.

The printer in Kraslavsky et al preferably communicates utilizing an Ethernet network. See e.g., column 9, lines 55-67 and line 34. The software utilized to control the communications over the network is preferably Novell NetWare. See e.g., column 11, lines 1-18. Additionally, the invention of Kraslavsky et al may also be implemented using Unix software. See column 4, lines 36-42.

It is further evident that in Kraslavsky et al that there is a desire to have a high-speed response or a near real-time response when determining status and control information. For example, column 14, lines 37-48 disclose the transmission of information such as the online/offline status and the time and date of the printer which are highly relevant in real-time or near-real-time status, and could be considered useless if transmitted after a delay.

Cohn et al merely disclose a system of transmitting messages between human users including using Internet electronic mail. See e.g., column 15, lines 31 and 32.

The outstanding Office Action asserts that it would have been obvious to modify the system of Kraslavsky et al which uses Novell NetWare to communicate messages so that there is communication of these messages using Internet e-mail as disclosed in Cohn et al "because it would allow message [sic messages] to be transferred globally between any devices." See the second paragraph of page 3 of the outstanding Office Action. However, as explained below, this motivation provided by the Examiner is not a reasonable motivation nor would it be sufficient motivation for one of ordinary skill in the art to combine the Internet e-mail disclosed in Cohn et al with the system of Kraslavsky et al to achieve the invention presently recited in the claims.

3. E-mail Has Historically Been a System for Transmitting Text Between Human Users

Historically, Internet e-mail messages were based upon and complied with RFC822 which is the "Standard for the Format of ARPA Internet Text Messages," 1982, a copy of which is included as Appendix C. Section 1.1 of the standard sets forth at the bottom of page 3 and the top of page 4 that the standard "specifies a syntax for *text messages* that are sent among computer *users*, within the framework of 'electronic mail'". While there have developed ways to send binary information utilizing the text encoding, there have historically been difficulties in sending binary messages utilizing Internet e-mail and there is no prior art of record disclosing Internet e-mail messages used outside of the context of messages which originate from a user and are transmitted to a user.² Further, Cohn et al merely disclose an e-mail message originating from a user and terminating at a user and neither disclose nor suggest the concept of transmitting information from sensors. Therefore, what one of ordinary skill in the art would know about Internet electronic mail messages is that they are primarily used for exchanging text messages between computer users and one of ordinary skill in the art, based on the knowledge available in the prior art, would not have recognized that an Internet electronic mail message could be utilized for communicating information which originated from sensors of a machine.³

² It is acknowledged that a computer can generate and send an electronic mail message automatically, for example in the context of a list server. When a user signs up to receive e-mails from the list server, the list server may automatically send an acknowledgment that the sign-up procedure was successful. However, the content of this message is set up by the administrator and has nothing to do with information gathered from sensors, but merely contains some predefined message whose content is predetermined by the person serving as the administrator.

³It is acknowledged that there is a way to transmit binary messages utilizing Internet e-mail and the present invention is not limited to the use of only text messages.

There is simply no prior art which discloses the use of Internet electronic mail messages to communicate except in the user-to-user context. Therefore, without a teaching or suggestion to use Internet e-mail to transmit information from sensors, one of ordinary skill in the art would not have any motivation to apply an Internet electronic mail system for exchanging text messages as disclosed in Cohn et al to the system of Kraslavsky et al in which there is communication with a non-human (e.g., the printer).

In determining the scope and content of the prior art, and determining whether the prior art suggested the claimed invention, the references "must be read as a whole and consideration must be given where the references diverge and teach away from the claimed invention." *Akzo N.V. v. United States Int'l Trade Comm'n*, 808 F.2d 1471, 1481, 1 USPQ2d 1241, 1246 (Fed. Cir. 1986). In this case, there is nothing within the prior art as a whole which suggests that Internet e-mail messages can be used to transmit information from the printer disclosed in Kraslavsky et al. As one of ordinary skill in the art would only recognize that Internet electronic mail messages were used for communication on a user-to-user basis, there simply is no motivation which exists within the prior art as a whole to utilize Internet electronic mail messages to communicate information with the printer disclosed in Kraslavsky et al.

4. The Examiner has not supplied a reasonable motivation to modify Kraslavsky et al to utilize Internet electronic mail communication

The outstanding Office Action states that it would have been obvious to use the Internet electronic mail message of Cohn et al in the system of Kraslavsky et al "because it would allow message [sic messages] to be transferred globally between any devices." See the second paragraph of page 3 of the Office Action mailed November 25, 1998. While not

expressly stated in the Official Action, the Examiner appears to be stating that because electronic mail messages operate in accordance with a standard which is implemented using a variety of hardware and software, the use of Internet electronic mail would provide an advantage to Kraslavsky et al. However, Kraslavsky et al already operate in accordance with well-known standards. The preferred implementation of Kraslavsky et al is using an Ethernet LAN. See column 4, lines 18-20, and column 9, lines 32-34 and 55-63. Further, the invention is preferably implemented using Novell NetWare software. See column 4, line 40 and column 13, line 29, for example. Appendix D includes the definition of "Ethernet" from the Microsoft Computer Dictionary. The definition of Ethernet is "an IEEE 802.3 **standard** for contention networks." Emphasis added. As Ethernet is a standard, it is easily implemented to transfer globally information between various types of devices.

Additionally, the Microsoft Computer Dictionary defines "NetWare" be a LAN operating system which runs on many different hardware platforms and network configurations (e.g., is standardized and already allows messages to be transferred globally. Thus, Kraslavsky et al already disclose a system which allows messages to be transferred globally between devices, and the advantage asserted by the Examiner which provides the motivation for modifying Kraslavsky et al already exists within Kraslavsky et al and therefore, one of ordinary skill in the art would not have this motivation for the modification. Still further, lines 1-4 of column 19 of Kraslavsky et al include the use of many different protocols including TCP/IP which already allows for global transfer between devices.

In summary regarding this argument, as Kraslavsky et al already provide a system which allows a number of protocols to be used in order to implement a global transfer between devices, there would be no motivation to modify Kraslavsky et al in order to achieve

global transfer as Kraslavsky et al already do achieve a global transfer using the protocols disclosed therein.

5. A Reference Cannot Be Modified to Destroy its Purpose

When modifying a reference in an obviousness rejection, the reference cannot be modified in such a way which is inconsistent or contrary to its teachings. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598-99 (Fed. Cir. 1988); *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984) ("In effect, [the prior art] teaches away from the board's proposed modification"); *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1568, 1 USPQ 1593, 1597 (Fed. Cir. 1987) (a prior art reference "must be considered in its entirety, i.e., as a whole, including portions that would lead away from the invention in suit"). As explained below, if Kraslavsky et al is modified so that it operates using Internet electronic mail, there are two reasons why the functionality performed by the Kraslavsky et al system would be diminished or destroyed.

a. Transmission in Near Real-Time is an Essential Feature of Kraslavsky et al
Kraslavsky et al disclose the communication of data in a real-time or near real-time manner. Specifically, beginning at col. 14 of Kraslavsky et al, there is described "a Customized PCONSOLE ("CPCONSOL")." This software provides extensions "to enable access to the powerful control and monitoring features of the ... printer." *Id.* at col. 14, lines 32-34. The type of information provided by the printer includes status and control information such as "online/offline," "no response," "time/date," "font information," "layout information," etc. This type of information is only useful if provided on a real-time or near

real-time basis. Internet e-mail has the potential to be a slow and unreliable mode of communication, and may be delivered in anywhere between a few seconds to a few days, or never at all. If Internet e-mail is not deliverable in 5 days, it should be returned to the sender. Still further, Internet e-mails can "disappear" without being delivered, and without any feedback being transmitted to the sender. Thus, using Internet e-mail would not be applicable to the invention of Kraslavsky et al. For example, normally it is relevant to know if a printer is online or offline (e.g., ready to use) at the current time (a near real-time basis). If it was known whether or not the printer was usable (online), a decision could be made whether or not to send the print job to that printer. Such information would be much less useful if received with the type of delay associated with Internet e-mail. Further, what use would time/date information of the printer be if sent via Internet e-mail?

Additionally, this status and control information is sent to a network (e.g., a LAN) administrator in Kraslavsky et al. *Id.* at col 15, lines 3-7. A network administrator who is performing a query would desire to receive this information, especially the "time/date" on an immediate basis, not using Internet electronic mail which would introduce a delay.

To state that it would be obvious to use an Internet electronic mail message, as disclosed in Cohn et al as the medium of communication of Kraslavsky et al is contradictory to the teachings of Kraslavsky et al.

If the prior art has as a purpose of near real-time monitoring and controlling of a printer, it is contrary to use one of the slowest mediums of electronically communicating data (an Internet electronic mail message) in such a device. Thus, it would *not* have been obvious to utilize an electronic mail message in Kraslavsky et al as this would improperly delay the communications.

b. Kraslavsky et al Require Transmission of Significant Amounts of Data

Kraslavsky et al is concerned with providing the ability to have a large amount of data communicated between the printer and the network. Specifically, the Related Art section of Kraslavsky et al in column 1 talks about the deficiency of other ways of coupling a printer to a network. It is clear that a major problem which the invention of Kraslavsky et al overcomes is the data throughput between the network and the printer. See specifically, column 1, lines 47-49 and lines 59-63. Further, Kraslavsky et al state that their system has a purpose "of transmitting to the network significant amounts of data" Col. 4, lines 3-12. Thus, an essential requirement of the Kraslavsky et al invention is to provide the ability to quickly communicate large amounts of data between the printer and a computer connected to the printer.

Therefore, it would be contrary to the teachings of Kraslavsky et al to modify its system to utilize Internet e-mail as such a communication medium is typically not used to transmit significant amounts of data.

Based on each of the above reasons, one of ordinary skill in the art would not modify Kraslavsky et al to use Internet electronic mail for communicating status and control information and therefore, the rejection under 35 U.S.C. §103 of the independent claims and each of the claims depending therefrom should be withdrawn.

B. Arguments With Respect to Group II

Group II which includes Claims 12 and 38 recites that the monitored device is a business office device. These claims are separately patentable from the invention of Group I as the invention(s) of Group I places no restriction on the type of the monitored device. Even

if prior art is located which does render unpatentable the invention(s) of Group I, the concept of the monitored device being a business office device is patentable over a non-business office device utilizing Internet electronic mail as the prior art of record does not disclose or suggest the use of Internet e-mail in a business office device in the manner set forth in Group II.

C. Arguments With Respect to Group III

Group III which includes Claims 13, 19, and 39 is directed towards the business office device being one of a copier, a facsimile machine, and a printer. Even if the concept of a generic business office device is rendered unpatentable by the prior art, the utilization of a copier, facsimile, or printer with electronic mail messages set forth in the combination recited in Group III is patentable over the prior art as no prior art discloses or suggests the use of Internet e-mail with such devices in the manner claimed.

D. Arguments With Respect to Group IV

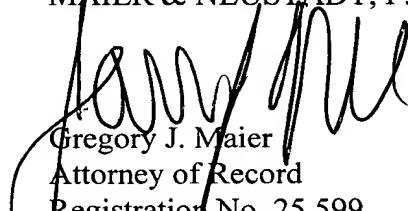
The invention(s) recited in Claims 18 and 44 recites the concept of using a connection-mode message when the status information is outside of the normal operating parameters. The outstanding Office Action did not address the specific limitations recited in Claims 18 and 44 and as a matter of fact, the Examiner of this application has found similar limitations to be patentable in the parent application, now U.S. patent no. 5,819,110. As Claims 18 and 44 within Group IV contained subject matter which is clearly allowable, the invention of Group IV is patentable.

IX. SUMMARY

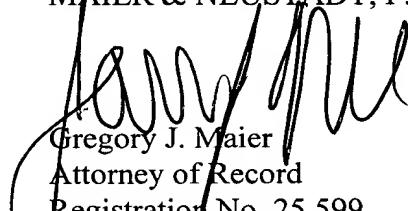
For the foregoing reasons, it is submitted that the rejection of each of the pending claims under 35 U.S.C. §103 as being unpatentable over Kraslavsky et al in view of Cohn et al is erroneous and a reversal of the rejection set forth by the outstanding Office Action is respectfully requested.

Respectfully submitted,

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APPENDIX A

Pending Claims of SN 08/738,659

10. A method for communicating between a monitored device and a monitoring device, comprising the steps of:

 determining information to be transmitted by the monitoring device to the monitored device, the information including a request for a status of the monitored device determined using sensors within the monitored device; and

 transmitting the information as an Internet electronic mail message over the Internet from the monitoring device to the monitored device.

12. A method according to claim 10, wherein the step of transmitting a message from the monitoring device comprises:

 transmitting a message to the monitored device which is a business office device.

13. A method according to claim 12, wherein the step of transmitting a message to the monitoring device comprises:

 transmitting a message to one of a copier, a facsimile machine, and a printer.

14. A method according to claim 10, further comprising the steps of:

 receiving the transmitted information by the monitored device; and

 transmitting an Internet electronic mail message from the monitored device to the monitoring device containing status information of the monitored device, in response to the transmitted information from the monitoring device.

15. A method according to claim 10, wherein the transmitting step comprises:

 transmitting the information from the monitoring device to a plurality of monitored devices including the monitored device.

16. A method for communicating between a machine and a monitoring device, comprising the steps of:

determining status information using at least one of a mechanical and electrical sensor; and

transmitting an Internet electronic mail message from the machine to the monitoring device containing the status information.

17. A method according to claim 16, further comprising the step of:

analyzing the status information by the machine,

wherein the status information is transmitted as the Internet electronic mail message from the machine when the status information is analyzed and determined to be within a standard operating range.

18. A method according to claim 17, further comprising the steps of:

determining status information which is outside of normal operating parameters exists in the machine using at least one of the mechanical and electrical sensor; and

transmitting a connection-mode message from the machine to the monitoring device containing the status information which is outside of the normal operating parameters.

19. A method according to claim 17, wherein the step of transmitting from the machine and the monitoring device comprises:

transmitting the Internet electronic mail message between the machine which is a device selected from the group consisting of a copier, a facsimile machine, and a printer, and the monitoring device.

36. A system for communicating between a monitored device and a monitoring device, comprising:

means for determining information to be transmitted by the monitoring device to the monitored device, the information including a request for a status of the monitored device determined using sensors within the monitored device; and

a transmitter of the monitoring device which transmits the information as an Internet electronic mail message over the Internet from the monitoring device to the monitored device.

38. A system according to claim 36, wherein the monitoring device is a business office device.

39. A system according to claim 38, wherein the business office device is one of a copier, a facsimile machine, and a printer.

40. A system according to claim 36, wherein the monitored device further comprises: a receiver which receives the transmitted information; and a transmitter which transmits an Internet electronic mail message from the monitored device to the monitoring device containing status information of the monitored device, in response to the transmitted information from the monitoring device.

41. A system according to claim 36, wherein the transmitter of the monitoring device comprises:

a transmitter which transmits the information from the monitoring device to a plurality of monitored devices including the monitored device.

42. A system for communicating between a machine and a monitoring device, comprising:

sensors within the machine which sense status information to be transmitted to the monitoring device; and

a transmitter of the machine which transmits the status information using an Internet electronic mail message from the machine to the monitoring device.

43. A system according to claim 42, further comprising:

means for analyzing the status information by the machine,

wherein the status information is transmitted using the transmitter of the machine when the status information is analyzed and determined to be within a standard operating range.

44. A system according to claim 43, further comprising:

means for determining status information which is outside of normal operating parameters exists in the machine using said sensors; and

transmitting a connection-mode message from the machine to the monitoring device containing the status information which is outside of the normal operating parameters.

52. A method according to claim 10, wherein the transmitting step comprises:

transmitting the information as the Internet electronic mail message which includes an identifier followed by an "@" symbol followed by a domain name.

53. A method according to claim 52, wherein the transmitting step further comprises:

transmitting the information as the Internet electronic mail message which includes a description of an encoding type of the e-mail message.

54. A method according to claim 10, wherein the transmitting step comprises:

transmitting the information as the Internet electronic mail message through a firewall of a network which includes the monitored device.

55. A method according to claim 54, wherein the transmitting step further comprises:

transmitting the information as the Internet electronic mail message which includes an identifier followed by an "@" symbol followed by a domain name.

56. A method according to claim 55, wherein the transmitting step further comprises: transmitting the information as the Internet electronic mail message which includes a description of an encoding type of the e-mail message.

57. A system according to claim 36, wherein the transmitter comprises: a device configured to transmit the information as the Internet electronic mail message which includes an identifier followed by an "@" symbol followed by a domain name.

58. A system according to claim 57, wherein the transmitter further comprises: a device configured to transmit the information as the Internet electronic mail message which includes a description of an encoding type of the e-mail message.

59. A system according to claim 36, wherein the transmitter comprises: a device configured to transmit the information as the Internet electronic mail message through a firewall of a network which includes the monitored device.

60. A system according to claim 59, wherein the transmitter further comprises: a device configured to transmit the information as the Internet electronic mail message which includes an identifier followed by an "@" symbol followed by a domain name.

61. A system according to claim 60, wherein the transmitter further comprises: a device configured to transmit the information as the Internet electronic mail message which includes a description of an encoding type of the e-mail message.

APPENDIX B

SN 08/738,659

PROPOSED FINDING OF FACT AND CONCLUSIONS OF LAW

A. Finding of Fact

1. A method and system which requests the status of a monitored device using sensors transmitted as an Internet electronic mail message over the Internet and the transmission of an Internet electronic mail message containing status information over the Internet is no where disclosed or suggested by the prior art of record.
2. Kraslavsky et al disclose a system in which the status and/or control information is transmitted utilizing an established standard, and requires the communication of certain types of information which would not be properly communicated using an Internet electronic mail message.
3. Cohn et al disclose the transmission of Internet electronic mail messages on a user-to-user basis but there is no disclosure or suggestion in Cohn et al to transmit information from sensors as recited in the claims or Internet electronic mail messages on a near real-time basis. Further, Internet electronic mail has historically been a text based system used to communicate text messages between users.
4. There is no motivation to modify or combine the references so that there is network communication between the printer and network of Kraslavsky et al utilizing electronic mail messages. Further, it would be contradictory to the teachings of Kraslavsky et al to modify Kraslavsky et al to use Internet electronic mail messages as Internet electronic mail messages are not a known or convenient manner for transmitting large amounts of data as required by Kraslavsky et al, nor do Internet electronic mail messages reliably transmit data on a real-time or a near real-time basis, as required by Kraslavsky et al.

B. Conclusions of Law

1. Several basic factual inquiries must be made in order to determine obviousness or non-obviousness of claims of a patent application under 35 U.S.C. §103. These factual inquiries are set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966):

Under §103, the scope and content of the prior art to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness of the subject matter is determined.

The specific factual inquiries set forth in Graham have not been properly applied by the Examiner in formulating the rejection of the subject claims. Particularly, the scope and content of the prior art and the level of ordinary skill in the pertinent art were not properly determined, demonstrated and applied to the claimed invention. In the present case, proper consideration of the factual inquiries demonstrates the non-obviousness of the claimed invention.

2. "Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combinations." In re Geiger, 815 F.2d 686, 2 USPQ2d 1276, 1278 (Fed. Cir. 1987). The Patent Office can only satisfy its burden to establish a *prima facie* case of obviousness "by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references." In re Fine, 837 F.2d 1071, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988).

3. The claimed subject matter would not have been obvious over the prior art.

4. The claimed invention is not unpatentable under 35 U.S.C. §103.

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APPENDIX C

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rfc822

SN 08/738,659

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Group 270



RFC # 822

Obsoletes: RFC #733 (NIC #41952)

STANDARD FOR THE FORMAT OF
ARPA INTERNET TEXT MESSAGES

August 13, 1982

Revised by

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Standard for ARPA Internet Text Messages

FEB 19 19

Group 270

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Standard for ARPA Internet Text Messages

PREFACE

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By 1977, the Arpanet employed several informal standards for the text messages (mail) sent among its host computers. It was felt necessary to codify these practices and provide for those features that seemed imminent. The result of that effort was Request for Comments (RFC) #733, "Standard for the Format of ARPA Network Text Message", by Crocker, Vittal, Pogran, and Henderson. The specification attempted to avoid major changes in existing software, while permitting several new features.

This document revises the specifications in RFC #733, in order to serve the needs of the larger and more complex ARPA Internet. Some of RFC #733's features failed to gain adequate acceptance. In order to simplify the standard and the software that follows it, these features have been removed. A different addressing scheme is used, to handle the case of inter-network mail; and the concept of re-transmission has been introduced.

This specification is intended for use in the ARPA Internet. However, an attempt has been made to free it of any dependence on that environment, so that it can be applied to other network text message systems.

The specification of RFC #733 took place over the course of one year, using the ARPANET mail environment, itself, to provide an on-going forum for discussing the capabilities to be included. More than twenty individuals, from across the country, participated in the original discussion. The development of this revised specification has, similarly, utilized network mail-based group discussion. Both specification efforts greatly benefited from the comments and ideas of the participants.

The syntax of the standard, in RFC #733, was originally specified in the Backus-Naur Form (BNF) meta-language. Ken L. Harrenstien, of SRI International, was responsible for re-coding the BNF into an augmented BNF that makes the representation smaller and easier to understand.

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1. INTRODUCTION

1.1. SCOPE

This standard specifies a syntax for text messages that are sent among computer users within the framework of "electronic mail". The standard supersedes the one specified in ARPANET Request for Comments #733, "Standard for the Format of ARPA Network Text Messages".

In this context, messages are viewed as having an envelope and contents. The envelope contains whatever information is needed to accomplish transmission and delivery. The contents compose the object to be delivered to the recipient. This standard applies only to the format and some of the semantics of message contents. It contains no specification of the information in the envelope.

However, some message systems may use information from the contents to create the envelope. It is intended that this standard facilitate the acquisition of such information by programs.

Some message systems may store messages in formats that differ from the one specified in this standard. This specification is intended strictly as a definition of what message content format is to be passed BETWEEN hosts.

Note: This standard is NOT intended to dictate the internal formats used by sites, the specific message system features that they are expected to support, or any of the characteristics of user interface programs that create or read messages.

A distinction should be made between what the specification REQUIRES and what it ALLOWS. Messages can be made complex and rich with formally-structured components of information or can be kept small and simple, with a minimum of such information. Also, the standard simplifies the interpretation of differing visual formats in messages; only the visual aspect of a message is affected and not the interpretation of information within it. Implementors may choose to retain such visual distinctions.

The formal definition is divided into four levels. The bottom level describes the meta-notation used in this document. The second level describes basic lexical analyzers that feed tokens to higher-level parsers. Next is an overall specification for messages; it permits distinguishing individual fields. Finally, there is definition of the contents of several structured fields.

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1.2. COMMUNICATION FRAMEWORK

Messages consist of lines of text. No special provisions are made for encoding drawings, facsimile, speech, or structured text. No significant consideration has been given to questions of data compression or to transmission and storage efficiency, and the standard tends to be free with the number of bits consumed. For example, field names are specified as free text, rather than special terse codes.

A general "memo" framework is used. That is, a message consists of some information in a rigid format, followed by the main part of the message, with a format that is not specified in this document. The syntax of several fields of the rigidly-formatted ("headers") section is defined in this specification; some of these fields must be included in all messages.

The syntax that distinguishes between header fields is

specified separately from the internal syntax for particular fields. This separation is intended to allow simple parsers to operate on the general structure of messages, without concern for the detailed structure of individual header fields. Appendix B is provided to facilitate construction of these parsers.

In addition to the fields specified in this document, it is expected that other fields will gain common use. As necessary, the specifications for these "extension-fields" will be published through the same mechanism used to publish this document. Users may also wish to extend the set of fields that they use privately. Such "user-defined fields" are permitted.

The framework severely constrains document tone and appearance and is primarily useful for most intra-organization communications and well-structured inter-organization communication. It also can be used for some types of inter-process communication, such as simple file transfer and remote job entry. A more robust framework might allow for multi-font, multi-color, multi-dimension encoding of information. A less robust one, as is present in most single-machine message systems, would more severely constrain the ability to add fields and the decision to include specific fields. In contrast with paper-based communication, it is interesting to note that the RECEIVER of a message can exercise an extraordinary amount of control over the message's appearance. The amount of actual control available to message receivers is contingent upon the capabilities of their individual message systems.

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2. NOTATIONAL CONVENTIONS

This specification uses an augmented Backus-Naur Form (BNF) notation. The differences from standard BNF involve naming rules and indicating repetition and "local" alternatives.

2.1. RULE NAMING

Angle brackets ("<", ">") are not used, in general. The name of a rule is simply the name itself, rather than "<name>". Quotation-marks enclose literal text (which may be upper and/or lower case). Certain basic rules are in uppercase, such as SPACE, TAB, CRLF, DIGIT, ALPHA, etc. Angle brackets are used in rule definitions, and in the rest of this document, whenever their presence will facilitate discerning the use of rule names.

2.2. RULE1 / RULE2: ALTERNATIVES

Elements separated by slash ("/") are alternatives. Therefore "foo / bar" will accept foo or bar.

2.3. (RULE1 RULE2): LOCAL ALTERNATIVES

Elements enclosed in parentheses are treated as a single element. Thus, "(elem (foo / bar) elem)" allows the token sequences "elem foo elem" and "elem bar elem".

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2.4. *RULE: REPETITION

The character "*" preceding an element indicates repetition. The full form is:

```
<l>*<m>element
```

indicating at least *<l>* and at most *<m>* occurrences of element. Default values are 0 and infinity so that "*(<element>)" allows any number, including zero; "1*<element>" requires at least one; and "1*2<element>" allows one or two.

2.5. [RULE]: OPTIONAL

Square brackets enclose optional elements; "[<foo> <bar>]" is equivalent to "*1(<foo> <bar>)".

2.6. NRULE: SPECIFIC REPETITION

"<n>(<element>)" is equivalent to "<n>*<n>(<element>)"; that is, exactly *<n>* occurrences of (<element>). Thus 2DIGIT is a 2-digit number, and 3ALPHA is a string of three alphabetic characters.

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2.7. #RULE: LISTS

A construct "#" is defined, similar to "*", as follows:

```
<l>#<m>element
```

indicating at least *<l>* and at most *<m>* elements, each separated by one or more commas (","). This makes the usual form of lists very easy; a rule such as '(<element> * (",", <element>))' can be shown as "1#<element>". Wherever this construct is used, null elements are allowed, but do not contribute to the count of elements present. That is, "(<element>),,(<element>)" is permitted, but counts as only two elements. Therefore, where at least one element is required, at least one non-null element must be present. Default values are 0 and infinity so that "#(<element>)" allows any number, including zero; "1#<element>" requires at least one; and "1#2<element>" allows one or two.

2.8. ; COMMENTS

A semi-colon, set off some distance to the right of rule text, starts a comment that continues to the end of line. This is a simple way of including useful notes in parallel with the specifications.

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3. LEXICAL ANALYSIS OF MESSAGES

3.1. GENERAL DESCRIPTION

A message consists of header fields and, optionally, a body. The body is simply a sequence of lines containing ASCII characters. It is separated from the headers by a null line (i.e., a line with nothing preceding the CRLF).

3.1.1. LONG HEADER FIELDS

Each header field can be viewed as a single, logical line of ASCII characters, comprising a field-name and a field-body. For convenience, the field-body portion of this conceptual entity can be split into a multiple-line representation; this is called "folding". The general rule is that wherever there may be linear-white-space (NOT simply LWSP-chars), a CRLF immediately followed by AT LEAST one LWSP-char may instead be inserted. Thus, the single line

To: "Joe & J. Harvey" <ddd @Org>, JJV @ BBN

can be represented as:

To: "Joe & J. Harvey" <ddd @ Org>,
JJV@BBN

and

To: "Joe & J. Harvey"
<ddd@ Org>, JJV
@BBN

and

To: "Joe &
J. Harvey" <ddd @ Org>, JJV @ BBN

The process of moving from this folded multiple-line representation of a header field to its single line representation is called "unfolding". Unfolding is accomplished by regarding CRLF immediately followed by a LWSP-char as

equivalent to the LWSP-char.

Note: While the standard permits folding wherever linear-white-space is permitted, it is recommended that structured fields, such as those containing addresses, limit folding to higher-level syntactic breaks. For address fields, it is recommended that such folding occur

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between addresses, after the separating comma.

3.1.2. STRUCTURE OF HEADER FIELDS

Once a field has been unfolded, it may be viewed as being composed of a field-name followed by a colon (":"), followed by a field-body, and terminated by a carriage-return/line-feed. The field-name must be composed of printable ASCII characters (i.e., characters that have values between 33. and 126., decimal, except colon). The field-body may be composed of any ASCII characters, except CR or LF. (While CR and/or LF may be present in the actual text, they are removed by the action of unfolding the field.)

Certain field-bodies of headers may be interpreted according to an internal syntax that some systems may wish to parse. These fields are called "structured fields". Examples include fields containing dates and addresses. Other fields, such as "Subject" and "Comments", are regarded simply as strings of text.

Note: Any field which has a field-body that is defined as other than simply <text> is to be treated as a structured field.

Field-names, unstructured field bodies and structured field bodies each are scanned by their own, independent "lexical" analyzers.

3.1.3. UNSTRUCTURED FIELD BODIES

For some fields, such as "Subject" and "Comments", no structuring is assumed, and they are treated simply as <text>s, as in the message body. Rules of folding apply to these fields, so that such field bodies which occupy several lines must therefore have the second and successive lines indented by at least one LWSP-char.

3.1.4. STRUCTURED FIELD BODIES

To aid in the creation and reading of structured fields, the free insertion of linear-white-space (which permits folding by inclusion of CRLFs) is allowed between lexical tokens. Rather than obscuring the syntax specifications for these structured fields with explicit syntax for this linear-white-space, the existence of another "lexical" analyzer is assumed. This analyzer does not apply for unstructured field bodies that are simply strings of text, as described above. The analyzer provides an interpretation of the unfolded text

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composing the body of the field as a sequence of lexical symbols.

These symbols are:

- individual special characters
- quoted-strings
- domain-literals
- comments
- atoms

The first four of these symbols are self-delimiting. Atoms are not; they are delimited by the self-delimiting symbols and by linear-white-space. For the purposes of regenerating sequences of atoms and quoted-strings, exactly one SPACE is assumed to exist, and should be used, between them. (Also, in the "Clarifications" section on "White Space", below, note the rules about treatment of multiple contiguous LWSP-chars.)

So, for example, the folded body of an address field

```
:sysmail"@ Some-Group. Some-Org,  
Muhammed. (I am the greatest) Ali @ (the) Vegas.WBA
```

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is analyzed into the following lexical symbols and types:

:sysmail	quoted string
@	special
Some-Group	atom
.	special
Some-Org	atom
,	special
Muhammed	atom
.	special
(I am the greatest)	comment
Ali	atom
@	atom
(the)	comment
Vegas	atom
.	special
WBA	atom

The canonical representations for the data in these addresses are the following strings:

" :sysmail" @Some-Group. Some-Org

and

Muhammed. Ali@Vegas. WBA

Note: For purposes of display, and when passing such structured information to other systems, such as mail protocol services, there must be NO linear-white-space between <word>s that are separated by period (".") or at-sign ("@") and exactly one SPACE between all other <word>s. Also, headers should be in a folded form.

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3.2. HEADER FIELD DEFINITIONS

These rules show a field meta-syntax, without regard for the particular type or internal syntax. Their purpose is to permit detection of fields; also, they present to higher-level parsers an image of each field as fitting on one line.

```
field      = field-name ":" [ field-body ] CRLF
field-name = 1*<any CHAR, excluding CTLs, SPACE, and ":">
field-body = field-body-contents
            [CRLF LWSP-char field-body]
field-body-contents =
            <the ASCII characters making up the field-body, as
            defined in the following sections, and consisting
            of combinations of atom, quoted-string, and
            specials tokens, or else consisting of texts>
```

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3.3. LEXICAL TOKENS

The following rules are used to define an underlying lexical analyzer, which feeds tokens to higher level parsers. See the ANSI references, in the Bibliography.

CHAR	= <any ASCII character>	; (Octal, Decimal.)
		; (0-177, 0.-127.)
ALPHA	= <any ASCII alphabetic character>	
		; (101-132, 65.- 90.)
		; (141-172, 97.-122.)
DIGIT	= <any ASCII decimal digit>	; (60- 71, 48.- 57.)
CTL	= <any ASCII control character and DEL>	; (0- 37, 0.- 31.)
		; (177, 127.)

```

CR      = <ASCII CR, carriage return> ; ( 15, 13.)
LF      = <ASCII LF, linefeed> ; ( 12, 10.)
SPACE   = <ASCII SP, space> ; ( 40, 32.)
HTAB    = <ASCII HT, horizontal-tab> ; ( 11, 9.)
<">    = <ASCII quote mark> ; ( 42, 34.)
CRLF   = CR LF

LWSP-char = SPACE / HTAB ; semantics = SPACE

linear-white-space = 1*([CRLF] LWSP-char) ; semantics = SPACE
; CRLF => folding

specials = "(" / ")" / "<" / ">" / "@" ; Must be in quoted-
; / "," / ";" / ":" / "\"" / "<"> ; string, to use
; / "." / "[" / "]" ; within a word.

delimiters = specials / linear-white-space / comment

text      = <any CHAR, including bare ; => atoms, specials,
           CR & bare LF, but NOT ; comments and
           including CRLF> ; quoted-strings are
           ; NOT recognized.

atom      = 1*<any CHAR except specials, SPACE and CTLs>

quoted-string = <"> * (qtext/quoted-pair) <">; Regular qtext or
; quoted chars.

qtext     = <any CHAR excepting "<">, ; => may be folded
           "\" & CR, and including
           linear-white-space>

domain-literal = "[" * (dtext / quoted-pair) "]"

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```

dtext     = <any CHAR excluding "[", ; => may be folded
           "]", "\" & CR, & including
           linear-white-space>

comment   = "(" * (ctext / quoted-pair / comment) ")"

ctext     = <any CHAR excluding "(", ; => may be folded
           ")", "\" & CR, & including
           linear-white-space>

quoted-pair = "\" CHAR ; may quote any char

phrase    = 1*word ; Sequence of words

word      = atom / quoted-string

```

3.4. CLARIFICATIONS

3.4.1. QUOTING

Some characters are reserved for special interpretation, such

as delimiting lexical tokens. To permit use of these characters as uninterpreted data, a quoting mechanism is provided. To quote a character, precede it with a backslash ("\").

This mechanism is not fully general. Characters may be quoted only within a subset of the lexical constructs. In particular, quoting is limited to use within:

- quoted-string
- domain-literal
- comment

Within these constructs, quoting is REQUIRED for CR and "\"" and for the character(s) that delimit the token (e.g., "(" and ")" for a comment). However, quoting is PERMITTED for any character.

Note: In particular, quoting is NOT permitted within atoms. For example when the local-part of an addr-spec must contain a special character, a quoted string must be used. Therefore, a specification such as:

Full\ Name@Domain

is not legal and must be specified as:

"Full Name"@Domain

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3.4.2. WHITE SPACE

Note: In structured field bodies, multiple linear space ASCII characters (namely HTABs and SPACES) are treated as single spaces and may freely surround any symbol. In all header fields, the only place in which at least one LWSP-char is REQUIRED is at the beginning of continuation lines in a folded field.

When passing text to processes that do not interpret text according to this standard (e.g., mail protocol servers), then NO linear-white-space characters should occur between a period (".") or at-sign ("@") and a <word>. Exactly ONE SPACE should be used in place of arbitrary linear-white-space and comment sequences.

Note: Within systems conforming to this standard, wherever a member of the list of delimiters is allowed, LWSP-chars may also occur before and/or after it.

Writers of mail-sending (i.e., header-generating) programs should realize that there is no network-wide definition of the effect of ASCII HT (horizontal-tab) characters on the appearance of text at another network host; therefore, the use of tabs in message headers, though permitted, is discouraged.

3.4.3. COMMENTS

A comment is a set of ASCII characters, which is enclosed in matching parentheses and which is not within a quoted-string

The comment construct permits message originators to add text which will be useful for human readers, but which will be ignored by the formal semantics. Comments should be retained while the message is subject to interpretation according to this standard. However, comments must NOT be included in other cases, such as during protocol exchanges with mail servers.

Comments nest, so that if an unquoted left parenthesis occurs in a comment string, there must also be a matching right parenthesis. When a comment acts as the delimiter between a sequence of two lexical symbols, such as two atoms, it is lexically equivalent with a single SPACE, for the purposes of regenerating the sequence, such as when passing the sequence onto a mail protocol server. Comments are detected as such only within field-bodies of structured fields.

If a comment is to be "folded" onto multiple lines, then the syntax for folding must be adhered to. (See the "Lexical

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Analysis of Messages" section on "Folding Long Header Fields" above, and the section on "Case Independence" below.) Note that the official semantics therefore do not "see" any unquoted CRLFs that are in comments, although particular parsing programs may wish to note their presence. For these programs, it would be reasonable to interpret a "CRLF LWSP-char" as being a CRLF that is part of the comment; i.e., the CRLF is kept and the LWSP-char is discarded. Quoted CRLFs (i.e., a backslash followed by a CR followed by a LF) still must be followed by at least one LWSP-char.

3.4.4. DELIMITING AND QUOTING CHARACTERS

The quote character (backslash) and characters that delimit syntactic units are not, generally, to be taken as data that are part of the delimited or quoted unit(s). In particular, the quotation-marks that define a quoted-string, the parentheses that define a comment and the backslash that quotes a following character are NOT part of the quoted-string, comment or quoted character. A quotation-mark that is to be part of a quoted-string, a parenthesis that is to be part of a comment and a backslash that is to be part of either must each be preceded by the quote-character backslash ("\""). Note that the syntax allows any character to be quoted within a quoted-string or comment; however only certain characters MUST be quoted to be included as data. These characters are the ones that are not part of the alternate text group (i.e., ctext or qtext).

The one exception to this rule is that a single SPACE is assumed to exist between contiguous words in a phrase, and this interpretation is independent of the actual number of LWSP-chars that the creator places between the words. To include more than one SPACE, the creator must make the LWSP-chars be part of a quoted-string.

Quotation marks that delimit a quoted string and backslashes that quote the following character should NOT accompany the

quoted-string when the string is passed to processes that do not interpret data according to this specification (e.g., mail protocol servers).

3.4.5. QUOTED-STRINGS

Where permitted (i.e., in words in structured fields) quoted-strings are treated as a single symbol. That is, a quoted-string is equivalent to an atom, syntactically. If a quoted-string is to be "folded" onto multiple lines, then the syntax for folding must be adhered to. (See the "Lexical Analysis of

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Messages" section on "Folding Long Header Fields" above, and the section on "Case Independence" below.) Therefore, the official semantics do not "see" any bare CRLFs that are in quoted-strings; however particular parsing programs may wish to note their presence. For such programs, it would be reasonable to interpret a "CRLF LWSP-char" as being a CRLF which is part of the quoted-string; i.e., the CRLF is kept and the LWSP-char is discarded. Quoted CRLFs (i.e., a backslash followed by a CR followed by a LF) are also subject to rules of folding, but the presence of the quoting character (backslash) explicitly indicates that the CRLF is data to the quoted string. Stripping off the first following LWSP-char is also appropriate when parsing quoted CRLFs.

3.4.6. BRACKETING CHARACTERS

There is one type of bracket which must occur in matched pairs and may have pairs nested within each other:

- o Parentheses "(" and ")" are used to indicate comments.

There are three types of brackets which must occur in matched pairs, and which may NOT be nested:

- o Colon/semi-colon ":" and ";" are used in address specifications to indicate that the included list of addresses are to be treated as a group.
- o Angle brackets "<" and ">" are generally used to indicate the presence of a one machine-usuable reference (e.g., delimiting mailboxes), possibly including source-routing to the machine.
- o Square brackets "[" and "]") are used to indicate the presence of a domain-literal, which the appropriate name-domain is to use directly, bypassing normal name-resolution mechanisms.

3.4.7. CASE INDEPENDENCE

Except as noted, alphabetic strings may be represented in any combination of upper and lower case. The only syntactic units

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which requires preservation of case information are:

- text
- qtext
- dtext
- ctext
- quoted-pair
- local-part, except "Postmaster"

When matching any other syntactic unit, case is to be ignored. For example, the field-names "From", "FROM", "from", and even "FroM" are semantically equal and should all be treated identically.

When generating these units, any mix of upper and lower case alphabetic characters may be used. The case shown in this specification is suggested for message-creating processes.

Note: The reserved local-part address unit, "Postmaster", is an exception. When the value "Postmaster" is being interpreted, it must be accepted in any mixture of case, including "POSTMASTER", and "postmaster".

3.4.8. FOLDING LONG HEADER FIELDS

Each header field may be represented on exactly one line consisting of the name of the field and its body, and terminated by a CRLF; this is what the parser sees. For readability, the field-body portion of long header fields may be "folded" onto multiple lines of the actual field. "Long" is commonly interpreted to mean greater than 65 or 72 characters. The former length serves as a limit, when the message is to be viewed on most simple terminals which use simple display software; however, the limit is not imposed by this standard.

Note: Some display software often can selectively fold lines, to suit the display terminal. In such cases, sender-provided folding can interfere with the display software.

3.4.9. BACKSPACE CHARACTERS

ASCII BS characters (Backspace, decimal 8) may be included in texts and quoted-strings to effect overstriking. However, any use of backspaces which effects an overstrike to the left of the beginning of the text or quoted-string is prohibited.

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3.4.10. NETWORK-SPECIFIC TRANSFORMATIONS

During transmission through heterogeneous networks, it may be necessary to force data to conform to a network's local conventions. For example, it may be required that a CR be followed either by LF, making a CRLF, or by <null>, if the CR is to stand alone). Such transformations are reversed, when the message exits that network.

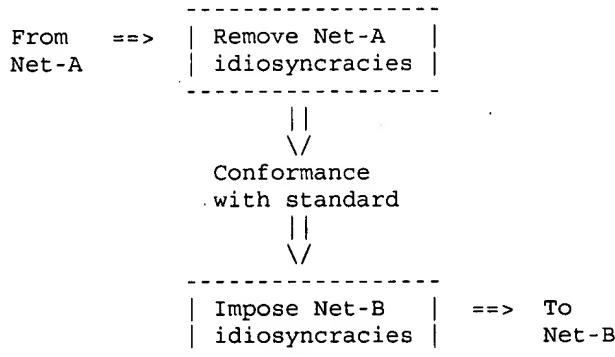
When crossing network boundaries, the message should be treated as passing through two modules. It will enter the first module containing whatever network-specific transformations that were necessary to permit migration through the "current" network. It then passes through the modules:

o Transformation Reversal

The "current" network's idiosyncrasies are removed and the message is returned to the canonical form specified in this standard.

o Transformation

The "next" network's local idiosyncrasies are imposed on the message.



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4. MESSAGE SPECIFICATION

4.1. SYNTAX

Note: Due to an artifact of the notational conventions, the syntax indicates that, when present, some fields, must be in a particular order. Header fields are NOT required to occur in any particular order, except that the message body must occur AFTER the headers. It is recommended that, if present, headers be sent in the order "Return-Path", "Received", "Date", "From", "Subject", "Sender", "To", "cc", etc.

This specification permits multiple occurrences of most fields. Except as noted, their interpretation is not specified here, and their use is discouraged.

The following syntax for the bodies of various fields should be thought of as describing each field body as a single long string (or line). The "Lexical Analysis of Message" section on "Long Header Fields", above, indicates how such long strings can be represented on more than one line in the actual transmitted message.

```

message      =  fields *( CRLF *text )          ; Everything after
                           ; first null line
                           ; is message body

fields       =  dates                         ; Creation time,
                           source                         ; author id & one
                           1*destination                   ; address required
                           *optional-field                 ; others optional

source       =  [ trace ]                      ; net traversals
                           originator                     ; original mail
                           [ resent ]                     ; forwarded

trace        =  return                         ; path to sender
                           1*received                     ; receipt tags

return       =  "Return-path" ":" route-addr ; return address

received     =  "Received" ":"                 ; one per relay
                           ["from" domain]            ; sending host
                           ["by" domain]              ; receiving host
                           ["via" atom]               ; physical path
                           *( "with" atom)            ; link/mail protocol
                           ["id" msg-id]              ; receiver msg id
                           ["for" addr-spec]           ; initial form

```

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```

          ";"      date-time          ; time received

originator =  authentic           ; authenticated addr
                           [ "Reply-To" ":" 1#address] )

authentic  =  "From"      ":"  mailbox ; Single author
                           / ( "Sender"    ":"  mailbox ; Actual submitor
                           "From"      ":" 1#mailbox) ; Multiple authors
                           ; or not sender

resent     =  resent-authentic

```

```

        [ "Resent-Reply-To" ":" 1#address] )

resent-authentic =
    = "Resent-From" ":" mailbox
    / ( "Resent-Sender" ":" mailbox
        "Resent-From" ":" 1#mailbox )

dates      = orig-date                      ; Original
            [ resent-date ]                  ; Forwarded

orig-date  = "Date" ":" date-time

resent-date = "Resent-Date" ":" date-time

destination = "To" ":" 1#address ; Primary
    / "Resent-To" ":" 1#address
    / "cc" ":" 1#address ; Secondary
    / "Resent-cc" ":" 1#address
    / "bcc" ":" #address ; Blind carbon
    / "Resent-bcc" ":" #address

optional-field =
    / "Message-ID" ":" msg-id
    / "Resent-Message-ID" ":" msg-id
    / "In-Reply-To" ":" *(phrase / msg-id)
    / "References" ":" *(phrase / msg-id)
    / "Keywords" ":" #phrase
    / "Subject" ":" *text
    / "Comments" ":" *text
    / "Encrypted" ":" 1#2word
    / extension-field           ; To be defined
    / user-defined-field        ; May be pre-empted

msg-id      = "<" addr-spec ">"           ; Unique message id

```

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```

extension-field =
    <Any field which is defined in a document
     published as a formal extension to this
     specification; none will have names beginning
     with the string "X->

user-defined-field =
    <Any field which has not been defined
     in this specification or published as an
     extension to this specification; names for
     such fields must be unique and may be
     pre-empted by published extensions>

```

4.2. FORWARDING

Some systems permit mail recipients to forward a message, retaining the original headers, by adding some new fields. This standard supports such a service, through the "Resent-" prefix to field names.

Whenever the string "Resent-" begins a field name, the field has the same semantics as a field whose name does not have the prefix. However, the message is assumed to have been forwarded by an original recipient who attached the "Resent-" field. This new field is treated as being more recent than the equivalent, original field. For example, the "Resent-From", indicates the person that forwarded the message, whereas the "From" field indicates the original author.

Use of such precedence information depends upon participants' communication needs. For example, this standard does not dictate when a "Resent-From:" address should receive replies, in lieu of sending them to the "From:" address.

Note: In general, the "Resent-" fields should be treated as containing a set of information that is independent of the set of original fields. Information for one set should not automatically be taken from the other. The interpretation of multiple "Resent-" fields, of the same type, is undefined.

In the remainder of this specification, occurrence of legal "Resent-" fields are treated identically with the occurrence of

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fields whose names do not contain this prefix.

4.3. TRACE FIELDS

Trace information is used to provide an audit trail of message handling. In addition, it indicates a route back to the sender of the message.

The list of known "via" and "with" values are registered with the Network Information Center, SRI International, Menlo Park, California.

4.3.1. RETURN-PATH

This field is added by the final transport system that delivers the message to its recipient. The field is intended to contain definitive information about the address and route back to the message's originator.

Note: The "Reply-To" field is added by the originator and serves to direct replies, whereas the "Return-Path" field is used to identify a path back to the originator.

While the syntax indicates that a route specification is optional, every attempt should be made to provide that information in this field.

4.3.2. RECEIVED

A copy of this field is added by each transport service that relays the message. The information in the field can be quite useful for tracing transport problems.

The names of the sending and receiving hosts and time-of-receipt may be specified. The "via" parameter may be used, to indicate what physical mechanism the message was sent over, such as Arpanet or Phonenet, and the "with" parameter may be used to indicate the mail-, or connection-, level protocol that was used, such as the SMTP mail protocol, or X.25 transport protocol.

Note: Several "with" parameters may be included, to fully specify the set of protocols that were used.

Some transport services queue mail; the internal message identifier that is assigned to the message may be noted, using the "id" parameter. When the sending host uses a destination address specification that the receiving host reinterprets, by

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expansion or transformation, the receiving host may wish to record the original specification, using the "for" parameter. For example, when a copy of mail is sent to the member of a distribution list, this parameter may be used to record the original address that was used to specify the list.

4.4. ORIGINATOR FIELDS

The standard allows only a subset of the combinations possible with the From, Sender, Reply-To, Resent-From, Resent-Sender, and Resent-Reply-To fields. The limitation is intentional.

4.4.1. FROM / RESENT-FROM

This field contains the identity of the person(s) who wished this message to be sent. The message-creation process should default this field to be a single, authenticated machine address, indicating the AGENT (person, system or process) entering the message. If this is not done, the "Sender" field MUST be present. If the "From" field IS defaulted this way, the "Sender" field is optional and is redundant with the "From" field. In all cases, addresses in the "From" field must be machine-usable (addr-specs) and may not contain named lists (groups).

4.4.2. SENDER / RESENT-SENDER

This field contains the authenticated identity of the AGENT (person, system or process) that sends the message. It is intended for use when the sender is not the author of the message, or to indicate who among a group of authors actually sent the message. If the contents of the "Sender" field would be completely redundant with the "From" field, then the "Sender" field need not be present and its use is discouraged (though still legal). In particular, the "Sender" field MUST

be present if it is NOT the same as the "From" Field.

The Sender mailbox specification includes a word sequence which must correspond to a specific agent (i.e., a human user or a computer program) rather than a standard address. This indicates the expectation that the field will identify the single AGENT (person, system, or process) responsible for sending the mail and not simply include the name of a mailbox from which the mail was sent. For example in the case of a shared login name, the name, by itself, would not be adequate. The local-part address unit, which refers to this agent, is expected to be a computer system term, and not (for example) a generalized person reference which can be used outside the network text message context.

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Since the critical function served by the "Sender" field is identification of the agent responsible for sending mail and since computer programs cannot be held accountable for their behavior, it is strongly recommended that when a computer program generates a message, the HUMAN who is responsible for that program be referenced as part of the "Sender" field mailbox specification.

4.4.3. REPLY-TO / RESENT-REPLY-TO

This field provides a general mechanism for indicating any mailbox(es) to which responses are to be sent. Three typical uses for this feature can be distinguished. In the first case, the author(s) may not have regular machine-based mailboxes and therefore wish(es) to indicate an alternate machine address. In the second case, an author may wish additional persons to be made aware of, or responsible for, replies. A somewhat different use may be of some help to "text message teleconferencing" groups equipped with automatic distribution services: include the address of that service in the "Reply-To" field of all messages submitted to the teleconference; then participants can "reply" to conference submissions to guarantee the correct distribution of any submission of their own.

Note: The "Return-Path" field is added by the mail transport service, at the time of final deliver. It is intended to identify a path back to the originator of the message. The "Reply-To" field is added by the message originator and is intended to direct replies.

4.4.4. AUTOMATIC USE OF FROM / SENDER / REPLY-TO

For systems which automatically generate address lists for replies to messages, the following recommendations are made:

- o The "Sender" field mailbox should be sent notices of any problems in transport or delivery of the original messages. If there is no "Sender" field, then the "From" field mailbox should be used.
- o The "Sender" field mailbox should NEVER be used automatically, in a recipient's reply message.

- o If the "Reply-To" field exists, then the reply should go to the addresses indicated in that field and not to the address(es) indicated in the "From" field.

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- o If there is a "From" field, but no "Reply-To" field, the reply should be sent to the address(es) indicated in the "From" field.

Sometimes, a recipient may actually wish to communicate with the person that initiated the message transfer. In such cases, it is reasonable to use the "Sender" address.

This recommendation is intended only for automated use of originator-fields and is not intended to suggest that replies may not also be sent to other recipients of messages. It is up to the respective mail-handling programs to decide what additional facilities will be provided.

Examples are provided in Appendix A.

4.5. RECEIVER FIELDS

4.5.1. TO / RESENT-TO

This field contains the identity of the primary recipients of the message.

4.5.2. CC / RESENT-CC

This field contains the identity of the secondary (informational) recipients of the message.

4.5.3. BCC / RESENT-BCC

This field contains the identity of additional recipients of the message. The contents of this field are not included in copies of the message sent to the primary and secondary recipients. Some systems may choose to include the text of the "Bcc" field only in the author(s)'s copy, while others may also include it in the text sent to all those indicated in the "Bcc" list.

4.6. REFERENCE FIELDS

4.6.1. MESSAGE-ID / RESENT-MESSAGE-ID

This field contains a unique identifier (the local-part address unit) which refers to THIS version of THIS message. The uniqueness of the message identifier is guaranteed by the host which generates it. This identifier is intended to be machine readable and not necessarily meaningful to humans. A message identifier pertains to exactly one instantiation of a particular message; subsequent revisions to the message should

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each receive new message identifiers.

4.6.2. IN-REPLY-TO

The contents of this field identify previous correspondence which this message answers. Note that if message identifiers are used in this field, they must use the msg-id specification format.

4.6.3. REFERENCES

The contents of this field identify other correspondence which this message references. Note that if message identifiers are used, they must use the msg-id specification format.

4.6.4. KEYWORDS

This field contains keywords or phrases, separated by commas.

4.7. OTHER FIELDS

4.7.1. SUBJECT

This is intended to provide a summary, or indicate the nature, of the message.

4.7.2. COMMENTS

Permits adding text comments onto the message without disturbing the contents of the message's body.

4.7.3. ENCRYPTED

Sometimes, data encryption is used to increase the privacy of message contents. If the body of a message has been encrypted, to keep its contents private, the "Encrypted" field can be used to note the fact and to indicate the nature of the encryption. The first <word> parameter indicates the software used to encrypt the body, and the second, optional <word> is intended to aid the recipient in selecting the proper decryption key. This code word may be viewed as an index to a table of keys held by the recipient.

Note: Unfortunately, headers must contain envelope, as well as contents, information. Consequently, it is necessary that they remain unencrypted, so that mail transport services may access them. Since names, addresses, and "Subject" field contents may contain

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sensitive information, this requirement limits total message privacy.

Names of encryption software are registered with the Network Information Center, SRI International, Menlo Park, California.

4.7.4. EXTENSION-FIELD

A limited number of common fields have been defined in this document. As network mail requirements dictate, additional fields may be standardized. To provide user-defined fields with a measure of safety, in name selection, such extension-fields will never have names that begin with the string "X-".

Names of Extension-fields are registered with the Network Information Center, SRI International, Menlo Park, California.

4.7.5. USER-DEFINED-FIELD

Individual users of network mail are free to define and use additional header fields. Such fields must have names which are not already used in the current specification or in any definitions of extension-fields, and the overall syntax of these user-defined-fields must conform to this specification's rules for delimiting and folding fields. Due to the extension-field publishing process, the name of a user-defined-field may be pre-empted.

Note: The prefatory string "X-" will never be used in the names of Extension-fields. This provides user-defined fields with a protected set of names.

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5. DATE AND TIME SPECIFICATION

5.1. SYNTAX

date-time = [day ","] date time ; dd mm yy
; hh:mm:ss zzz

```

day      = "Mon" / "Tue" / "Wed" / "Thu"
        / "Fri" / "Sat" / "Sun"

date     = 1*2DIGIT month 2DIGIT      ; day month year
          ; e.g. 20 Jun 82

month    = "Jan" / "Feb" / "Mar" / "Apr"
        / "May" / "Jun" / "Jul" / "Aug"
        / "Sep" / "Oct" / "Nov" / "Dec"

time     = hour zone                ; ANSI and Military

hour     = 2DIGIT ":" 2DIGIT [":" 2DIGIT]
          ; 00:00:00 - 23:59:59

zone     = "UT" / "GMT"              ; Universal Time
          ; North American : UT
        / "EST" / "EDT"              ; Eastern: - 5/ - 4
        / "CST" / "CDT"              ; Central: - 6/ - 5
        / "MST" / "MDT"              ; Mountain: - 7/ - 6
        / "PST" / "PDT"              ; Pacific: - 8/ - 7
        / 1ALPHA
        / ( ("+" / "-") 4DIGIT )    ; Military: Z = UT;
          ; A:-1; (J not used)
          ; M:-12; N:+1; Y:+12
          ; Local differential
          ; hours+min. (HHMM)

```

5.2. SEMANTICS

If included, day-of-week must be the day implied by the date specification.

Time zone may be indicated in several ways. "UT" is Universal Time (formerly called "Greenwich Mean Time"); "GMT" is permitted as a reference to Universal Time. The military standard uses a single character for each zone. "Z" is Universal Time. "A" indicates one hour earlier, and "M" indicates 12 hours earlier; "N" is one hour later, and "Y" is 12 hours later. The letter "J" is not used. The other remaining two forms are taken from ANSI standard X3.51-1975. One allows explicit indication of the amount of offset from UT; the other uses common 3-character strings for indicating time zones in North America.

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6. ADDRESS SPECIFICATION

6.1. SYNTAX

```

address   = mailbox                  ; one addressee
          / group                   ; named list

group     = phrase ":" [#mailbox] ";"

mailbox   = addr-spec               ; simple address
          / phrase route-addr      ; name & addr-spec

route-addr = "<" [route] addr-spec ">"

route     = 1#("@ domain) ":"        ; path-relative

```

```
addr-spec  = local-part "@" domain      ; global address
local-part = word *( "." word)        ; uninterpreted
                           ; case-preserved
domain     = sub-domain *( "." sub-domain)
sub-domain = domain-ref / domain-literal
domain-ref = atom                   ; symbolic reference
```

6.2. SEMANTICS

A mailbox receives mail. It is a conceptual entity which does not necessarily pertain to file storage. For example, some sites may choose to print mail on their line printer and deliver the output to the addressee's desk.

A mailbox specification comprises a person, system or process name reference, a domain-dependent string, and a name-domain reference. The name reference is optional and is usually used to indicate the human name of a recipient. The name-domain reference specifies a sequence of sub-domains. The domain-dependent string is uninterpreted, except by the final sub-domain; the rest of the mail service merely transmits it as a literal string.

6.2.1. DOMAINS

A name-domain is a set of registered (mail) names. A name-domain specification resolves to a subordinate name-domain specification or to a terminal domain-dependent string. Hence, domain specification is extensible, permitting any number of registration levels.

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Name-domains model a global, logical, hierarchical addressing scheme. The model is logical, in that an address specification is related to name registration and is not necessarily tied to transmission path. The model's hierarchy is a directed graph, called an in-tree, such that there is a single path from the root of the tree to any node in the hierarchy. If more than one path actually exists, they are considered to be different addresses.

The root node is common to all addresses; consequently, it is not referenced. Its children constitute "top-level" name-domains. Usually, a service has access to its own full domain specification and to the names of all top-level name-domains.

The "top" of the domain addressing hierarchy -- a child of the root -- is indicated by the right-most field, in a domain specification. Its child is specified to the left, its child to the left, and so on.

Some groups provide formal registration services; these constitute name-domains that are independent logically of specific machines. In addition, networks and machines implicitly compose name-domains, since their membership usually is

registered in name tables.

In the case of formal registration, an organization implements a (distributed) data base which provides an address-to-route mapping service for addresses of the form:

person@registry.organization

Note that "organization" is a logical entity, separate from any particular communication network.

A mechanism for accessing "organization" is universally available. That mechanism, in turn, seeks an instantiation of the registry; its location is not indicated in the address specification. It is assumed that the system which operates under the name "organization" knows how to find a subordinate registry. The registry will then use the "person" string to determine where to send the mail specification.

The latter, network-oriented case permits simple, direct, attachment-related address specification, such as:

user@host.network

Once the network is accessed, it is expected that a message will go directly to the host and that the host will resolve

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the user name, placing the message in the user's mailbox.

6.2.2. ABBREVIATED DOMAIN SPECIFICATION

Since any number of levels is possible within the domain hierarchy, specification of a fully qualified address can become inconvenient. This standard permits abbreviated domain specification, in a special case:

For the address of the sender, call the left-most sub-domain Level N. In a header address, if all of the sub-domains above (i.e., to the right of) Level N are the same as those of the sender, then they do not have to appear in the specification. Otherwise, the address must be fully qualified.

This feature is subject to approval by local sub-domains. Individual sub-domains may require their member systems, which originate mail, to provide full domain specification only. When permitted, abbreviations may be present only while the message stays within the sub-domain of the sender.

Use of this mechanism requires the sender's sub-domain to reserve the names of all top-level domains, so that full specifications can be distinguished from abbreviated specifications.

For example, if a sender's address is:

sender@registry-A.registry-1.organization-X

and one recipient's address is:

recipient@registry-B.registry-1.organization-X

and another's is:

recipient@registry-C.registry-2.organization-X

then ".registry-1.organization-X" need not be specified in the the message, but "registry-C.registry-2" DOES have to be specified. That is, the first two addresses may be abbreviated, but the third address must be fully specified.

When a message crosses a domain boundary, all addresses must be specified in the full format, ending with the top-level name-domain in the right-most field. It is the responsibility of mail forwarding services to ensure that addresses conform

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with this requirement. In the case of abbreviated addresses, the relaying service must make the necessary expansions. It should be noted that it often is difficult for such a service to locate all occurrences of address abbreviations. For example, it will not be possible to find such abbreviations within the body of the message. The "Return-Path" field can aid recipients in recovering from these errors.

Note: When passing any portion of an addr-spec onto a process which does not interpret data according to this standard (e.g., mail protocol servers). There must be NO LWSP-chars preceding or following the at-sign or any delimiting period ("."), such as shown in the above examples, and only ONE SPACE between contiguous <word>s.

6.2.3. DOMAIN TERMS

A domain-ref must be THE official name of a registry, network, or host. It is a symbolic reference, within a name sub-domain. At times, it is necessary to bypass standard mechanisms for resolving such references, using more primitive information, such as a network host address rather than its associated host name.

To permit such references, this standard provides the domain-literal construct. Its contents must conform with the needs of the sub-domain in which it is interpreted.

Domain-literals which refer to domains within the ARPA Internet specify 32-bit Internet addresses, in four 8-bit fields noted in decimal, as described in Request for Comments #820, "Assigned Numbers." For example:

[10.0.3.19]

Note: THE USE OF DOMAIN-LITERALS IS STRONGLY DISCOURAGED. It is permitted only as a means of bypassing temporary system limitations, such as name tables which are not

complete.

The names of "top-level" domains, and the names of domains under in the ARPA Internet, are registered with the Network Information Center, SRI International, Menlo Park, California.

6.2.4. DOMAIN-DEPENDENT LOCAL STRING

The local-part of an addr-spec, in a mailbox specification (i.e., the host's name for the mailbox) is understood to be

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whatever the receiving mail protocol server allows. For example, some systems do not understand mailbox references of the form "P. D. Q. Bach", but others do.

This specification treats periods (".") as lexical separators. Hence, their presence in local-parts which are not quoted-strings, is detected. However, such occurrences carry NO semantics. That is, if a local-part has periods within it, an address parser will divide the local-part into several tokens, but the sequence of tokens will be treated as one uninterpreted unit. The sequence will be re-assembled, when the address is passed outside of the system such as to a mail protocol service.

For example, the address:

First.Last@Registry.Org

is legal and does not require the local-part to be surrounded with quotation-marks. (However, "First Last" DOES require quoting.) The local-part of the address, when passed outside of the mail system, within the Registry.Org domain, is "First.Last", again without quotation marks.

6.2.5. BALANCING LOCAL-PART AND DOMAIN

In some cases, the boundary between local-part and domain can be flexible. The local-part may be a simple string, which is used for the final determination of the recipient's mailbox. All other levels of reference are, therefore, part of the domain.

For some systems, in the case of abbreviated reference to the local and subordinate sub-domains, it may be possible to specify only one reference within the domain part and place the other, subordinate name-domain references within the local-part. This would appear as:

mailbox.sub1.sub2@this-domain

Such a specification would be acceptable to address parsers which conform to RFC #733, but do not support this newer Internet standard. While contrary to the intent of this standard, the form is legal.

Also, some sub-domains have a specification syntax which does not conform to this standard. For example:

sub-net.mailbox@sub-domain.domain

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uses a different parsing sequence for local-part than for domain.

Note: As a rule, the domain specification should contain fields which are encoded according to the syntax of this standard and which contain generally-standardized information. The local-part specification should contain only that portion of the address which deviates from the form or intention of the domain field.

6.2.6. MULTIPLE MAILBOXES

An individual may have several mailboxes and wish to receive mail at whatever mailbox is convenient for the sender to access. This standard does not provide a means of specifying "any member of" a list of mailboxes.

A set of individuals may wish to receive mail as a single unit (i.e., a distribution list). The *<group>* construct permits specification of such a list. Recipient mailboxes are specified within the bracketed part (":" - ";"). A copy of the transmitted message is to be sent to each mailbox listed. This standard does not permit recursive specification of groups within groups.

While a list must be named, it is not required that the contents of the list be included. In this case, the *<address>* serves only as an indication of group distribution and would appear in the form:

name:;

Some mail services may provide a group-list distribution facility, accepting a single mailbox reference, expanding it to the full distribution list, and relaying the mail to the list's members. This standard provides no additional syntax for indicating such a service. Using the *<group>* address alternative, while listing one mailbox in it, can mean either that the mailbox reference will be expanded to a list or that there is a group with one member.

6.2.7. EXPLICIT PATH SPECIFICATION

At times, a message originator may wish to indicate the transmission path that a message should follow. This is called source routing. The normal addressing scheme, used in an *addr-spec*, is carefully separated from such information; the *<route>* portion of a *route-addr* is provided for such occasions. It specifies the sequence of hosts and/or transmission

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services that are to be traversed. Both domain-refs and domain-literals may be used.

Note: The use of source routing is discouraged. Unless the sender has special need of path restriction, the choice of transmission route should be left to the mail transport service.

6.3. RESERVED ADDRESS

It often is necessary to send mail to a site, without knowing any of its valid addresses. For example, there may be mail system dysfunctions, or a user may wish to find out a person's correct address, at that site.

This standard specifies a single, reserved mailbox address (local-part) which is to be valid at each site. Mail sent to that address is to be routed to a person responsible for the site's mail system or to a person with responsibility for general site operation. The name of the reserved local-part address is:

Postmaster

so that "Postmaster@domain" is required to be valid.

Note: This reserved local-part must be matched without sensitivity to alphabetic case, so that "POSTMASTER", "postmaster", and even "poStmAStEr" is to be accepted.

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APPENDIX

A. EXAMPLES

A.1. ADDRESSES

A.1.1. Alfred Neuman <Neuman@BBN-TENEXA>

A.1.2. Neuman@BBN-TENEXA

These two "Alfred Neuman" examples have identical semantics, as far as the operation of the local host's mail sending (distribution) program (also sometimes called its "mailer") and the remote host's mail protocol server are concerned. In the first example, the "Alfred Neuman" is ignored by the mailer, as "Neuman@BBN-TENEXA" completely specifies the recipient. The second example contains no superfluous information, and, again, "Neuman@BBN-TENEXA" is the intended recipient.

pient.

Note: When the message crosses name-domain boundaries, then these specifications must be changed, so as to indicate the remainder of the hierarchy, starting with the top level.

A.1.3. "George, Ted" <Shared@Group.Arpanet>

This form might be used to indicate that a single mailbox is shared by several users. The quoted string is ignored by the originating host's mailer, because "Shared@Group.Arpanet" completely specifies the destination mailbox.

A.1.4. Wilt . (the Stilt) Chamberlain@NBA.US

The "(the Stilt)" is a comment, which is NOT included in the destination mailbox address handed to the originating system's mailer. The local-part of the address is the string "Wilt.Chamberlain", with NO space between the first and second words.

A.1.5. Address Lists

Gourmets: Pompous Person <WhoZiWhatZit@Cordon-Bleu>,
Childs@WGBH.Boston, Galloping Gourmet@
ANT.Down-Under (Australian National Television),
Cheapie@Discount-Liquors;
Cruisers: Port@Portugal, Jones@SEA;
Another@Somewhere.SomeOrg

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This group list example points out the use of comments and the mixing of addresses and groups.

A.2. ORIGINATOR ITEMS

A.2.1. Author-sent

George Jones logs into his host as "Jones". He sends mail himself.

From: Jones@Group.Org

or

From: George Jones <Jones@Group.Org>

A.2.2. Secretary-sent

George Jones logs in as Jones on his host. His secretary, who logs in as Secy sends mail for him. Replies to the mail should go to George.

From: George Jones <Jones@Group>
Sender: Secy@Other-Group

A.2.3. Secretary-sent, for user of shared directory

George Jones' secretary sends mail for George. Replies should go to George.

From: George Jones<Shared@Group.Org>
Sender: Secy@Other-Group

Note that there need not be a space between "Jones" and the "<", but adding a space enhances readability (as is the case in other examples).

A.2.4. Committee activity, with one author

George is a member of a committee. He wishes to have any replies to his message go to all committee members.

From: George Jones <Jones@Host.Net>
Sender: Jones@Host
Reply-To: The Committee: Jones@Host.Net,
Smith@Other.Org,
Doe@Somewhere-Else;

Note that if George had not included himself in the

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enumeration of The Committee, he would not have gotten an implicit reply; the presence of the "Reply-to" field SUPERSEDES the sending of a reply to the person named in the "From" field.

A.2.5. Secretary acting as full agent of author

George Jones asks his secretary (Secy@Host) to send a message for him in his capacity as Group. He wants his secretary to handle all replies.

From: George Jones <Group@Host>
Sender: Secy@Host
Reply-To: Secy@Host

A.2.6. Agent for user without online mailbox

A friend of George's, Sarah, is visiting. George's secretary sends some mail to a friend of Sarah in computer-land. Replies should go to George, whose mailbox is Jones at Registry.

From: Sarah Friendly <Secy@Registry>
Sender: Secy-Name <Secy@Registry>
Reply-To: Jones@Registry.

A.2.7. Agent for member of a committee

George's secretary sends out a message which was authored jointly by all the members of a committee. Note that the name of the committee cannot be specified, since <group> names are not permitted in the From field.

From: Jones@Host,
Smith@Other-Host,

Doe@Somewhere-Else
Sender: Secy@SHost

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A.3. COMPLETE HEADERS

A.3.1. Minimum required

Date: 26 Aug 76 1429 EDT	Date: 26 Aug 76 1429 EDT
From: Jones@Registry.Org	From: Jones@Registry.Org
Bcc:	To: Smith@Registry.Org

Note that the "Bcc" field may be empty, while the "To" field is required to have at least one address.

A.3.2. Using some of the additional fields

Date: 26 Aug 76 1430 EDT
From: George Jones<Group@Host>
Sender: Secy@SHOST
To: "Al Neuman"@Mad-Host,
Sam.Irving@Other-Host
Message-ID: <some.string@SHOST>

A.3.3. About as complex as you're going to get

Date : 27 Aug 76 0932 PDT
From : Ken Davis <KDavis@This-Host.This-net>
Subject : Re: The Syntax in the RFC
Sender : KSecy@Other-Host
Reply-To : Sam.Irving@Reg.Organization
To : George Jones <Group@Some-Reg.An-Org>,
Al.Neuman@MAD.Publisher
cc : Important folk:
Tom Softwood <Balsa@Tree.Root>,
"Sam Irving"@Other-Host;
Standard Distribution:
/main/davis/people/standard@Other-Host,
"<Jones>standard.dist.3"@Tops-20-Host>;
Comment : Sam is away on business. He asked me to handle
his mail for him. He'll be able to provide a
more accurate explanation when he returns
next week.
In-Reply-To: <some.string@DBM.Group>, George's message
X-Special-action: This is a sample of user-defined field-
names. There could also be a field-name
"Special-action", but its name might later be

preempted
Message-ID: <4231.629.XYzi-What@Other-Host>

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B. SIMPLE FIELD PARSING

Some mail-reading software systems may wish to perform only minimal processing, ignoring the internal syntax of structured field-bodies and treating them the same as unstructured-field-bodies. Such software will need only to distinguish:

- o Header fields from the message body,
- o Beginnings of fields from lines which continue fields,
- o Field-names from field-contents.

The abbreviated set of syntactic rules which follows will suffice for this purpose. It describes a limited view of messages and is a subset of the syntactic rules provided in the main part of this specification. One small exception is that the contents of field-bodies consist only of text:

B.1. SYNTAX

```
message      =  *field *(CRLF *text)
field       =  field-name ":" [field-body] CRLF
field-name  =  1*<any CHAR, excluding CTLs, SPACE, and ":">
field-body  =  *text [CRLF LWSP-char field-body]
```

B.2. SEMANTICS

Headers occur before the message body and are terminated by a null line (i.e., two contiguous CRLFs).

A line which continues a header field begins with a SPACE or HTAB character, while a line beginning a field starts with a printable character which is not a colon.

A field-name consists of one or more printable characters (excluding colon, space, and control-characters). A field-name MUST be contained on one line. Upper and lower case are not distinguished when comparing field-names.

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C. DIFFERENCES FROM RFC #733

The following summarizes the differences between this standard and the one specified in Arpanet Request for Comments #733, "Standard for the Format of ARPA Network Text Messages". The differences are listed in the order of their occurrence in the current specification.

C.1. FIELD DEFINITIONS

C.1.1. FIELD NAMES

These now must be a sequence of printable characters. They may not contain any LWSP-chars.

C.2. LEXICAL TOKENS

C.2.1. SPECIALS

The characters period ("."), left-square bracket ("["), and right-square bracket ("]") have been added. For presentation purposes, and when passing a specification to a system that does not conform to this standard, periods are to be contiguous with their surrounding lexical tokens. No linear-white-space is permitted between them. The presence of one LWSP-char between other tokens is still directed.

C.2.2. ATOM

Atoms may not contain SPACE.

C.2.3. SPECIAL TEXT

ctext and qtext have had backslash ("\") added to the list of prohibited characters.

C.2.4. DOMAINS

The lexical tokens <domain-literal> and <dtext> have been added.

C.3. MESSAGE SPECIFICATION

C.3.1. TRACE

The "Return-path:" and "Received:" fields have been specified.

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C.3.2. FROM

The "From" field must contain machine-usable addresses (addr-spec). Multiple addresses may be specified, but named-lists (groups) may not.

C.3.3. RESENT

The meta-construct of prefacing field names with the string "Resent-" has been added, to indicate that a message has been forwarded by an intermediate recipient.

C.3.4. DESTINATION

A message must contain at least one destination address field. "To" and "CC" are required to contain at least one address.

C.3.5. IN-REPLY-TO

The field-body is no longer a comma-separated list, although a sequence is still permitted.

C.3.6. REFERENCE

The field-body is no longer a comma-separated list, although a sequence is still permitted.

C.3.7. ENCRYPTED

A field has been specified that permits senders to indicate that the body of a message has been encrypted.

C.3.8. EXTENSION-FIELD

Extension fields are prohibited from beginning with the characters "X-".

C.4. DATE AND TIME SPECIFICATION

C.4.1. SIMPLIFICATION

Fewer optional forms are permitted and the list of three-letter time zones has been shortened.

C.5. ADDRESS SPECIFICATION

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C.5.1. ADDRESS

The use of quoted-string, and the ":"-atom-":" construct, have been removed. An address now is either a single mailbox reference or is a named list of addresses. The latter indicates a group distribution.

C.5.2. GROUPS

Group lists are now required to have a name. Group lists may not be nested.

C.5.3. MAILBOX

A mailbox specification may indicate a person's name, as before. Such a named list no longer may specify multiple mailboxes and may not be nested.

C.5.4. ROUTE ADDRESSING

Addresses now are taken to be absolute, global specifications, independent of transmission paths. The <route> construct has been provided, to permit explicit specification of transmission path. RFC #733's use of multiple at-signs ("@") was intended as a general syntax for indicating routing and/or hierarchical addressing. The current standard separates these specifications and only one at-sign is permitted.

C.5.5. AT-SIGN

The string " at " no longer is used as an address delimiter. Only at-sign ("@") serves the function.

C.5.6. DOMAINS

Hierarchical, logical name-domains have been added.

C.6. RESERVED ADDRESS

The local-part "Postmaster" has been reserved, so that users can be guaranteed at least one valid address at a site.

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D. ALPHABETICAL LISTING OF SYNTAX RULES

```
address      = mailbox                      ; one addressee
              / group                        ; named list
addr-spec    = local-part "@" domain        ; global address
ALPHA        = <any ASCII alphabetic character>
              ; (101-132, 65.- 90.)
              ; (141-172, 97.-122.)
atom         = 1*<any CHAR except specials, SPACE and CTLs>
authentic    = "From" ":" mailbox          ; Single author
              / ( "Sender" ":" mailbox        ; Actual submittor
                  "From" ":" 1#mailbox) ; Multiple authors
              ; or not sender
CHAR         = <any ASCII character>        ; ( 0-177, 0.-127.)
comment      = "(" *(ctext / quoted-pair / comment) ")"
```

```

CR      = <ASCII CR, carriage return> ; (      15,      13.)
CRLF   = CR LF
ctext   = <any CHAR excluding "(",      ; => may be folded
          ")" , "\" & CR, & including
          linear-white-space>
CTL     = <any ASCII control      ; (  0- 37,  0.- 31.)
          character and DEL> ; (  177,      127.)
date   = 1*2DIGIT month 2DIGIT ; day month year
        ; e.g. 20 Jun 82
dates  = orig-date ; Original
        [ resent-date ] ; Forwarded
date-time = [ day "," ] date time ; dd mm yy
        ; hh:mm:ss zzz
day    = "Mon" / "Tue" / "Wed" / "Thu"
        / "Fri" / "Sat" / "Sun"
delimiters = specials / linear-white-space / comment
destination = "To"      ":" 1#address ; Primary
        / "Resent-To" ":" 1#address
        / "cc"      ":" 1#address ; Secondary
        / "Resent-cc" ":" 1#address
        / "bcc"      ":" #address ; Blind carbon
        / "Resent-bcc" ":" #address
DIGIT   = <any ASCII decimal digit> ; ( 60- 71, 48.- 57.)
domain  = sub-domain *( "." sub-domain)
domain-literal = "[" *(dtext / quoted-pair) "]"
domain-ref = atom ; symbolic reference
dtext   = <any CHAR excluding "[",      ; => may be folded
          "]", "\" & CR, & including
          linear-white-space>
extension-field =
        <Any field which is defined in a document
        published as a formal extension to this
        specification; none will have names beginning
        with the string "X->

```

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```

field   = field-name ":" [ field-body ] CRLF
fields  = dates ; Creation time,
          source ; author id & one
          1*destination ; address required
          *optional-field ; others optional
field-body = field-body-contents
            [CRLF LWSP-char field-body]
field-body-contents =
        <the ASCII characters making up the field-body, as
        defined in the following sections, and consisting
        of combinations of atom, quoted-string, and
        specials tokens, or else consisting of texts>
field-name = 1*<any CHAR, excluding CTLs, SPACE, and ":">
group    = phrase ":" [#mailbox] ";"
hour     = 2DIGIT ":" 2DIGIT [ ":" 2DIGIT]
          ; 00:00:00 - 23:59:59
HTAB    = <ASCII HT, horizontal-tab> ; (      11,      9.)
LF      = <ASCII LF, linefeed> ; (      12,      10.)
linear-white-space = 1*([CRLF] LWSP-char) ; semantics = SPACE
          ; CRLF => folding
local-part = word *( "." word) ; uninterpreted
          ; case-preserved
LWSP-char = SPACE / HTAB ; semantics = SPACE

```

```

mailbox = addr-spec ; simple address
/ phrase route-addr ; name & addr-spec
message = fields *( CRLF *text ) ; Everything after
; first null line
; is message body
month = "Jan" / "Feb" / "Mar" / "Apr"
/ "May" / "Jun" / "Jul" / "Aug"
/ "Sep" / "Oct" / "Nov" / "Dec"
msg-id = "<" addr-spec ">" ; Unique message id
optional-field =
/ "Message-ID" ":" msg-id
/ "Resent-Message-ID" ":" msg-id
/ "In-Reply-To" ":" *(phrase / msg-id)
/ "References" ":" *(phrase / msg-id)
/ "Keywords" ":" #phrase
/ "Subject" ":" *text
/ "Comments" ":" *text
/ "Encrypted" ":" 1#2word
/ extension-field ; To be defined
/ user-defined-field ; May be pre-empted
orig-date = "Date" ":" date-time
originator = authentic ; authenticated addr
[ "Reply-To" ":" 1#address]
phrase = 1*word ; Sequence of words

```

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```

qtext = <any CHAR excepting ">, ; => may be folded
      "\" & CR, and including
      linear-white-space>
quoted-pair = "\" CHAR ; may quote any char
quoted-string = "<" * (qtext/quoted-pair) "> ; Regular qtext or
; quoted chars.
received = "Received" ":" ; one per relay
      [ "from" domain] ; sending host
      [ "by" domain] ; receiving host
      [ "via" atom] ; physical path
      *( "with" atom) ; link/mail protocol
      [ "id" msg-id] ; receiver msg id
      [ "for" addr-spec] ; initial form
      ";" date-time ; time received

resent = resent-authentic
      [ "Resent-Reply-To" ":" 1#address]
resent-authentic =
      = "Resent-From" ":" mailbox
      / ( "Resent-Sender" ":" mailbox
      "Resent-From" ":" 1#mailbox )
resent-date = "Resent-Date" ":" date-time
return = "Return-path" ":" route-addr ; return address
route = 1#("@ domain") ":" ; path-relative
route-addr = "<" [route] addr-spec ">"
source = [ trace ] ; net traversals
      originator ; original mail
      [ resent ] ; forwarded
SPACE = <ASCII SP, space> ; ( 40, 32.)
specials = "(" / ")" / "<" / ">" / "@" ; Must be in quoted-
/ "," / ";" / ":" / "\"" / "<"> ; string, to use

```

```
        /  ". " / "[ " / " ] " ; within a word.
sub-domain  =  domain-ref / domain-literal
text        =  <any CHAR, including bare ; => atoms, specials,
               CR & bare LF, but NOT ; comments and
               including CRLF> ; quoted-strings are
                           ; NOT recognized.
time        =  hour zone ; ANSI and Military
trace       =  return ; path to sender
               1*received ; receipt tags
user-defined-field =
               <Any field which has not been defined
               in this specification or published as an
               extension to this specification; names for
               such fields must be unique and may be
               pre-empted by published extensions>
word        =  atom / quoted-string
```

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```
zone      =  "UT"  /  "GMT" ; Universal Time
           /  "EST" /  "EDT" ; North American : UT
           /  "CST" /  "CDT" ; Eastern: - 5/ - 4
           /  "MST" /  "MDT" ; Central: - 6/ - 5
           /  "PST" /  "PDT" ; Mountain: - 7/ - 6
           /  1ALPHA          ; Pacific: - 8/ - 7
           /  1ALPHA          ; Military: Z = UT;
           <">      =  <ASCII quote mark> ; ( 42, 34.)
```

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APPENDIX D

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Dictionary**

Third Edition

***Microsoft* Press**

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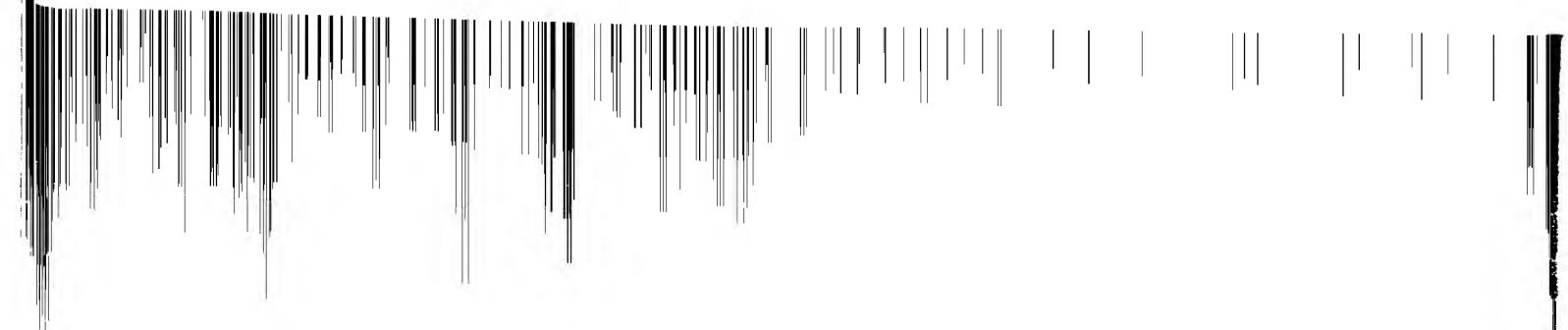
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ESC character \e-skāp' kār ək-tər\ *n.* One of the 32 control codes defined in the ASCII character set. It usually indicates the beginning of an escape sequence (a string of characters that give instructions to a device such as a printer). It is represented internally as character code 27 (hexadecimal 1B). *Also called escape character.*

Esc key \e-skāp' kē\ *n.* *See* Escape key.

ESD \E'S-D\ *n.* *See* electronic software distribution, electrostatic discharge.

ESDI \E'S-D-I\, ez'dē\ *n.* Acronym for Enhanced Small Device Interface. A device that allows disks to communicate with computers at high speeds. ESDI drives typically transfer data at about 10 megabits per second, but they are capable of doubling that speed.

ESP \E'S-P\ *n.* *See* enhanced serial port.

ESP IEEE standard \E'S-P' I-E-E-E' stan'dārd\ *n.* Short for Encapsulating Security Payload **IEEE standard**. A standard for providing integrity and confidentiality to IP (Internet Protocol) datagrams. In some circumstances, it can also provide authentication to IP datagrams. *See also* authentication, datagram, IEEE, IP.

.et \dot'E-T\ *n.* On the Internet, the major geographic domain specifying that an address is located in Ethiopia.

e-text \E'tekst\ *n.* Short for **electronic text**. A book or other text-based work that is available on line in an electronic media format. An e-text can be read on line or downloaded to a user's computer for offline reading. *See also* ezine.

Ethernet \e'thər-net\ *n.* **1.** An IEEE 802.3 standard for contention networks. Ethernet uses a bus or star topology and relies on the form of access known as Carrier Sense Multiple Access with Collision Detection (CSMA/CD) to regulate communication line traffic. Network nodes are linked by coaxial cable, by fiber-optic cable, or by twisted-pair wiring. Data is transmitted in variable-length frames containing delivery and control information and up to 1,500 bytes of data. The Ethernet standard provides for baseband transmission at 10 megabits (10 million bits) per second. *See also* 10Base2, 10Base5, 10BaseF, 10BaseT, baseband, bus network, coaxial cable, contention, CSMA/CD, IEEE 802 standards, twisted-pair cable. **2.** A widely used local area network system developed by

Xerox in 1976, from which the IEEE 802.3 standard was developed.

Ethernet/802.3 \e'thər-net'-ō-tōd' point-thrē\ *n.* The IEEE standard for 10- or 100-Mbps transmissions over an Ethernet network. Ethernet/802.3 defines both hardware and data packet construction specifications.

E-time \ē'tīm\ *n.* *See* execution time.

etiquette \et'ē-kāt\ *n.* *See* netiquette.

ETX \E'T-X\ *n.* *See* end-of-text.

Eudora \yōō'dōr'ə\ *n.* An e-mail client program originally developed as freeware for Macintosh computers by Steve Dorner at the University of Illinois, now maintained in both freeware and commercial versions for both Macintosh and Microsoft Windows by Qualcomm, Inc.

EULA \yōō'lə, E'U-L-A\ *n.* *See* End-User License Agreement.

European Computer Manufacturers Association \yər-ə-pē'ən kəm-pyōtər man'yu-fak'chūr-əz ə-sō-sē-ā'shən\ *n.* *See* ECMA.

European Laboratory for Particle Physics \yər-ə-pē'ən lab'rə-tōr'ē för pār'tikəl fiz'iks\ *n.* *See* CERN.

evaluation \i-val'yōō-ā'shən\ *n.* The determination, by a program, of the value of an expression or the action that a program statement specifies. Evaluation can take place at compile time or at run time.

even parity \ē'ven pār'ē-tē\ *n.* *See* parity.

event \ə-vent', ē-vent\ *n.* An action or occurrence, often generated by the user, to which a program might respond—for example, key presses, button clicks, or mouse movements. *See also* event-driven programming.

event-driven \ə-vent' driv'ən, ē-vent'\ *adj.* Of, pertaining to, or being software that accomplishes its purpose by responding to externally caused events, such as the user pressing a key or clicking a button on a mouse. For example, an event-driven data entry form will allow the user to click on and edit any field at any time rather than forcing the user to step through a fixed sequence of prompts.

event-driven processing \ə-vent' driv-ən pros'ēs-ēng, ē-vent'\ *n.* A program feature belonging to more advanced operating-system architectures such as the Apple Macintosh operating system,

cially available Web browsers. *See also* Mosaic, Web browser.

Netscape Server Application Programming Interface \net-skāp sər-vər ə-plə-kā'shən prōgrām-ēng in'tər-fās\ *n. See* NSAPI.

Netspeak \net'spēk\ *n.* The set of conventions for writing English in e-mail, IRCs, and newsgroups. Netspeak is characterized by acronyms (such as IMHO or ROFL) and clarifying devices such as emotags and emoticons. Use of Netspeak should be governed by netiquette. *See also* emotag, emoticon, IMHO, IRC, netiquette, ROFL.

Net surfing \net' sur fēng\ *n.* The practice of exploring the Internet without a specific goal in mind. The concept of Net surfing is similar to (and probably derived from) "channel surfing" in reference to watching television.

net-top box \net'top boks\ *n.* A type of personal computer with a reduced number of components that is built primarily to provide a low-cost access terminal to the various services available on the Internet, such as e-mail, Web access, and telnet connectivity. These machines, which are under development, will not have locally addressable hard disks or installable programs, but will obtain any necessary materials for the user from somewhere on a network to which the net-top box is connected. *Compare* Java terminal, NetPC.

Net TV \net' T-V\ *n. See* Internet television.

NetWare \net'wār\ *n.* Novell's LAN operating system. NetWare runs on many different hardware platforms and network configurations.

network \net'wərk\ *n.* A group of computers and associated devices that are connected by communications facilities. A network can involve permanent connections, such as cables, or temporary connections made through telephone or other communication links. A network can be as small as a local area network consisting of a few computers, printers, and other devices, or it can consist of many small and large computers distributed over a vast geographic area.

network adapter \net'wərk ə-dap'tər\ *n.* An expansion card or other device used to connect a computer to a local area network.

network address translation \net'wərk ə'dres tranz-lā'shən, ə-dres'\ *n. See* NAT.

network administrator \net'wərk əd-min'ə-strātər\ *n.* The person in charge of operations on a computer network. The duties of a network administrator can be broad and might include such tasks as installing new workstations and other devices, adding and removing individuals from the list of authorized users, archiving files, overseeing password protection and other security measures, monitoring usage of shared resources, and handling malfunctioning equipment. *See also* system administrator.

network architecture \net'wərk ər'kə-tek-chər\ *n.* The underlying structure of a computer network, including hardware, functional layers, interfaces, and protocols, used to establish communication and ensure the reliable transfer of information. Network architectures are designed to provide both philosophical and physical standards for the complexities of establishing communications links and transferring information without conflict. Various network architectures exist, including the internationally accepted seven-layer ISO Open Systems Interconnection (OSI) model and IBM's Systems Network Architecture (SNA). *See also* ISO/OSI model, SNA.

network card \net'wərk kārd\ *n. See* network adapter.

network computer \net'wərk kəm-pyōtər\ *n.* A computer having the hardware and software necessary for it to be connected to a network. *Acronym: NC (N-C).*

network control program \net'wərk kən-trōl prō-gram\ *n.* In a communications network that includes a mainframe computer, a program that usually resides in a communications controller and takes over communications tasks such as routing, error control, line control, and polling (checking terminals for transmissions), leaving the main computer free for other functions. *See also* communications controller.

network database \net'wərk dā'tə-bās\ *n. 1.* A database that runs in a network. *2.* A database containing the address of other users in the network. *3.* In information management, a type of database in which data records can be related to one another in more than one way. A network database is similar to a hierarchical database in the